

**COMMONWEALTH OF VIRGINIA**  
**Department of Environmental Quality**  
**Water Division**

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**Subject:** **Guidance Memo No. 14-2011**  
Nutrient Monitoring for "Nonsignificant" Discharges to the Chesapeake Bay Watershed

**To:** Regional Directors

**From:** Melanie D. Davenport, Director 

**Date:** August 8, 2014

**Copies:** Deputy Regional Directors, Regional Water Permit Managers, James Golden and Fred Cunningham

**Summary:**

The purpose of this guidance is to establish standard nutrient monitoring conditions in individual VPDES permits in order to develop data necessary to reevaluate the aggregate "nonsignificant" point source wasteload allocations included in the Chesapeake Bay TMDL. This data may also be used to establish the permitted design capacity for expanding industrial dischargers in the Chesapeake Bay watershed.

**Electronic Copy:**

An electronic copy of this guidance in PDF format is available for staff internally on DEQNET, and for the general public on DEQ's website on the [Water Permit Guidance](#) web page.

**Contact Information:**

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**Disclaimer:**

**This document is provided as guidance and, as such, sets forth standard operating procedures for the agency. However, it does not mandate or prohibit any particular action not otherwise required or prohibited by law or regulation. If alternative proposals are made, such proposals will be reviewed and accepted or denied based on their technical adequacy and compliance with appropriate laws and regulations.**

## **Background and Purpose**

The purpose of this guidance is to establish standard nutrient monitoring conditions in individual VPDES permits in order to develop data necessary to reevaluate the Virginia point source wasteload allocations (WLAs) included in the Chesapeake Bay TMDL. The December 2010 Chesapeake Bay TMDL includes individual WLAs for all "significant" dischargers in the Bay watershed (with the exception of aggregate Chlorophyll-a based WLAs in the James River Basin). "Significant" dischargers in the Virginia portion of the Bay watershed are defined under the Nutrient Trading Watershed General Permit Regulation (9 VAC 25-820):

*"Significant discharger" means (i) a sewage treatment works discharging to the Chesapeake Bay watershed upstream of the fall line with a design capacity of 0.5 million gallons per day or greater, or an equivalent load discharged from industrial facilities; (ii) a sewage treatment works discharging to the Chesapeake Bay watershed downstream of the fall line with a design capacity of 0.1 million gallons per day or greater, or an equivalent load discharged from industrial facilities; (iii) a planned or newly expanding sewage treatment works discharging to the Chesapeake Bay watershed upstream of the fall line that is expected to be in operation by December 31, 2010, with a permitted design of 0.5 million gallons per day or greater, or an equivalent load to be discharged from industrial facilities; or (iv) a planned or newly expanding sewage treatment works discharging to the Chesapeake Bay watershed downstream of the fall line that is expected to be in operation by December 31, 2010, with a design capacity of 0.1 million gallons per day or greater, or an equivalent load to be discharged from industrial facilities.*

All dischargers that do not meet this definition are deemed "nonsignificant" dischargers and were included in aggregate WLAs in the TMDL. Numeric WLAs are included in the watershed general permit for all significant dischargers and new or expanding nonsignificant dischargers that meet the criteria included in Part I.G. of the general permit. In keeping with Virginia's Phase I Watershed Implementation Plan (November 29, 2010), compliance with individual numeric WLAs is not required of existing nonsignificant facilities until they expand and trigger the nutrient offset requirements included in the watershed general permit. The nutrient monitoring required by this guidance is intended to provide additional data for the reevaluation of WLAs for nonsignificant facilities. For expanding nonsignificant industrial facilities it will also serve to establish the appropriate "permitted design capacity" for the existing treatment system.

## **Affected Permitted Discharges**

The monitoring requirements contained in this guidance apply to all "nonsignificant" dischargers in the Chesapeake Bay watershed that are not actively monitoring and reporting under the watershed general permit unless they are an industrial discharger that has previously demonstrated through monitoring or by characterizing the nature of the discharge that they are not a source of a net Total Phosphorous (TP) or Total Nitrogen (TN) load. Examples of industrial discharges not expected to be a source of net TP or TN loads include the following **if**

**they make no use of chemical additives containing nitrogen or phosphorous compounds** - noncontact cooling water, water treatment plants, quarries not using blasting agents and concrete plants.

The data developed from the monitoring requirements contained in this guidance are intended to provide information for the reevaluation of the aggregate nonsignificant WLAs in the Chesapeake Bay TMDL. It is therefore not the intent of this guidance to require nutrient monitoring of nonsignificant facilities beyond a single permit term.

### **Discharges other than Industrial Stormwater**

#### **Monitoring Requirements**

Individual VPDES permits for all affected dischargers (as defined in the previous section) should include annual nutrient monitoring (concentration only) for a single permit term as follows:

Parameter	Parameter Code	Frequency
Total Phosphorous	012	1/Year
TKN	068	1/Year
Nitrite + Nitrate	389	1/Year
Total Nitrogen <sup>(1)</sup>	013	1/Year
TSS	004	1/Year (if not previously characterized)

The sample type for TP, TKN, Nitrite+Nitrate and TSS (if appropriate) should be consistent with the most stringent sample type used for any other parameter in the VPDES permit (excluding flow). The sample type for TN should be "Calc". Additionally, the effluent limits page should include the following footnote for TN:

<sup>(1)</sup>Total Nitrogen, which is the sum of TKN and Nitrite + Nitrate, shall be derived from the results of those tests.

#### **Compliance Reporting Special Condition**

The following language should be added to the standard municipal or industrial Compliance Reporting special condition.

*For Total Phosphorus, all daily concentration data below the quantification level (QL) for the analytical method used should be treated as half the QL. All daily concentration data equal to or above the QL for the analytical method used shall be treated as it is reported.*

*For Total Nitrogen (TN), if none of the daily concentration data for the respective species (i.e., TKN, Nitrates/Nitrites) are equal to or above the QL for the respective analytical methods used, the daily TN concentration value reported shall equal one half of the largest QL used for the respective species. If one of the data is equal to or above the QL, the daily TN concentration value shall be treated as that data point is reported. If more than one of*

*the data is above the QL, the daily TN concentration value shall equal the sum of the data points as reported.*

Specific QLs are not recommended in this guidance however dischargers of wastestreams expected to be low in nutrients should be made aware of the above reporting requirements and encouraged to use lower level QLs.

### **Fact Sheet Language**

The Fact Sheet Basis for Effluent Limitations Table should include "BPJ" for the nutrient monitoring requirements with the following narrative rationale:

#### **Nutrient Monitoring Requirements**

*Nonsignificant dischargers are subject to aggregate wasteload allocations for Total Nitrogen (TN), Total Phosphorous (TP) and Sediments under the Total Maximum Daily Load (TMDL) for Chesapeake Bay. Monitoring of TN, TP and TSS is required in order to verify the aggregate wasteload allocations.*

### **Discharges of Industrial Stormwater**

Individual VPDES permits for industrial stormwater should contain permit requirements consistent with the VPDES Industrial Stormwater General Permit (9 VAC 25-151-70). This includes semi-annual nutrient monitoring for the first two years of the permit for a total of four samples.

Parameter	Parameter Code	Frequency
Total Phosphorous	012	1/6 Months for 2 Years
TKN	068	1/6 Months for 2 Years
Nitrite + Nitrate	389	1/6 Months for 2 Years
Total Nitrogen <sup>(1)</sup>	013	1/6 Months for 2 Years
TSS	004	1/6 Months for 2 Years (if not previously characterized)

<sup>(1)</sup>Total Nitrogen, which is the sum of TKN and Nitrite + Nitrate, shall be derived from the results of those tests.

Note that due to the difficulty in accurately quantifying stormwater loads and the aggregate nature of the TMDL WLAs, it is not DEQ's intent to place numeric limitations in industrial stormwater permits. This guidance follows the approach used under the industrial stormwater general permit in which sampling results are compared to aggregate TDML loading values and additional practices are implemented under a TMDL action plan if necessary.

The following special condition should be substituted for Part I.B.7 of the general permit. Parts I.B.8 through I.B.9 of the general permit, also addressing requirements of the Chesapeake Bay

TMDL, should be included in the individual VPDES permit as well. (**Notes:** References to specific permit sections in bold font below refer to either the VPDES Industrial Stormwater General Permit (9 VAC 25-151-70) or the individual permit special condition. References to the individual permit special condition are designated by the use of “*of this subsection*”. **All references should be changed to cite the corresponding condition in the individual VPDES permit or the condition below should be modified if there is no corresponding condition in the individual VPDES permit.** Guidance provided herein is specific to the monitoring of nutrients for nonsignificant dischargers in the Chesapeake Bay watershed. The industrial stormwater general permit and associated guidance memorandum as well as the Permit Manual should be consulted for all other provisions not specifically related to nutrients monitoring.)

### **Special Condition for Discharges of Industrial Stormwater**

#### *7. Discharges of industrial stormwater to waters subject to TMDL wasteload allocations.*

- a. (Include this special condition for stormwater discharges containing a pollutant of concern for which a TMDL wasteload allocation has been approved prior to permit issuance. Delete 7.a. and renumber the subsequent sections if the discharge is not subject to a local TMDL)**

*The permittee shall incorporate measures and controls into the SWPPP required by **Part III** that are consistent with the assumptions and requirements of the total maximum daily load (TMDL) for (**name of water body**). The facility's SWPPP shall specifically address any conditions or requirements included in the TMDL that are applicable to discharges from the facility. If the TMDL establishes a specific numeric wasteload allocation that applies to discharges from the facility, the owner shall perform any required monitoring in accordance with **Part I.A.1.c (3)**, and implement control measures designed to meet that allocation.*

- b. Facilities in the Chesapeake Bay watershed.*

- (1) Owners of facilities in the Chesapeake Bay watershed shall monitor their industrial stormwater discharges for total suspended solids (TSS), total nitrogen (TN), and total phosphorus (TP) to characterize the contributions from their facility's specific industrial sector for these parameters. Samples shall be collected during each of the first four monitoring periods (i.e., the first two years of permit coverage). Monitoring periods are specified in **Part I.A.2**. Samples shall be collected and analyzed in accordance with **Part I.A.2**. Monitoring results shall be reported in accordance with **Part I.A.5** and **Part II.C**, and retained in accordance with **Part II.B**.*

- (2) Chesapeake Bay TMDL wasteload allocations and Chesapeake Bay TMDL action plans.*

- (a) EPA's Chesapeake Bay TMDL (December 29, 2010) includes wasteload allocations for VPDES permitted industrial stormwater facilities as part of the regulated stormwater aggregate load. EPA used data submitted by Virginia with the Phase I Chesapeake Bay TMDL Watershed Implementation Plan, including the number of industrial stormwater permits per county and the number of urban acres regulated by industrial stormwater permits, as part of their development of the aggregate load. Aggregate loads for industrial stormwater facilities were appropriate because*

*actual facility loading data were not available to develop individual facility wasteload allocations.*

*Virginia estimated the loadings from industrial stormwater facilities using actual and estimated facility acreage information, and TP, TN, and TSS loading values from the Northern Virginia Planning District Commission (NVPDC) Guidebook for Screening Urban Nonpoint Pollution Management Strategies, prepared for the Metropolitan Washington Council of Governments. Annandale, VA. November, 1979. The loading values used were as follows:*

*TP - High (80%) imperviousness industrial; 1.5 lb/ac/yr*

*TN - High (80%) imperviousness industrial; 12.3 lb/ac/yr*

*TSS - High (80%) imperviousness industrial; 440 lb/ac/yr*

*The actual facility area information, and the TP, TN and TSS data collected for this permit will be used by DEQ to quantify the nutrient and sediment loads from VPDES permitted industrial stormwater facilities, and will be submitted to EPA to aid them in further refinements to their Chesapeake Bay TMDL model. The loading information will also be used by DEQ to determine any additional load reductions needed for industrial stormwater facilities for the next reissuance of this permit.*

- (b) Data analysis and Chesapeake Bay TMDL action plans. The permittee shall analyze the nutrient and sediment data collected in accordance with subdivision 7.b.(1) of **this subsection** to determine if additional action is needed for this permit term. The permittee shall average the data collected at the facility for each of the pollutants of concern (POC) (e.g., TP, TN and TSS) and compare the results to the loading values for TP, TN and TSS presented in subdivision 7.b.(2)(a) of **this subsection**. To calculate the facility loadings, the permittee shall use either the actual annual average rainfall data for the facility location (in inches/year) or the Virginia annual average rainfall of 44.3 inches/year.*

*The following formula or a site specific, DEQ-approved calculation shall be used to determine the loading value:*

$$L = 0.226 \times R \times C$$

*Equation (1)*

where:

L = the Pollutant of Concern (POC) loading value (lb/acre/year)

C = the POC average concentration of all facility samples (mg/L)

0.226 = unit conversion factor

R = annual runoff (in/yr), calculated as:  $R = P \times P_j \times R_v$

where:

P = annual rainfall (in/yr) [use the Virginia annual average of 44.3 in/yr, or site specific annual rainfall for your area of the State]

P<sub>j</sub> = the fraction of annual events that produce runoff (usually 0.9)

R<sub>v</sub> = the runoff coefficient, which can be expressed as:  $R_v = 0.05 + (0.9 \times I_a)$

$I_a$  = the impervious fraction [*the ratio of facility impervious area to the total facility area*]

or,  $I_a = \text{AREAIMPERVIOUS} / \text{AREATOTAL}$

Substituting in Equation (1):

$$L = 0.226 \times P \times P_j \times (0.05 + (0.9 \times I_a)) \times C \quad \text{Equation (2)}$$

- (c) *If the calculated facility loading value for TP, TN or TSS is less than the corresponding loading value presented in subdivision 7.b.(2)(a) of this subsection, then the calculations demonstrating that no reduction is necessary shall be submitted within 90 days from the end of the second year’s monitoring period. The calculations shall include a site map with the total site area, the areas associated with industrial activity and the total impervious area.*

*If the calculated facility loading value for TP, TN or TSS exceeds the corresponding loading value presented in subdivision 7.b.(2)(a) of this subsection, then the permittee shall develop and submit a Chesapeake Bay TMDL Action Plan to DEQ for review and approval. The plan shall include a site map with the total site area, the areas associated with industrial activity and the total impervious area. The permittee shall implement the applicable elements of the approved plan over the remaining term of this permit and achieve all the necessary reductions by June 30, 2024. . **The plan shall be submitted within 90 days from the end of the second year's monitoring period.** The action plan shall include:*

- (i) A determination of the total pollutant load reductions for TP, TN and TSS (as appropriate) necessary to reduce the annual loads from industrial activities. This shall be determined by calculating the difference between the loading values listed in subdivision 7.b.(2)(a) of this subsection, and the average of the sampling data for TP, TN or TSS (as appropriate) for the entire facility. The reduction applies to the total difference calculated for each pollutant of concern;*
  - (ii) The means and methods, such as management practices and retrofit programs, that will be utilized to meet the required reductions determined in subdivision 7.b.(2)(c)(i) of this subsection, and a schedule to achieve those reductions by June 30, 2024. The schedule should include annual benchmarks to demonstrate the ongoing progress in meeting those reductions;*
  - (iii) The permittee may consider utilization of any pollutant trading or offset program in accordance with §§ 62.1-44.19:20 through 62.1-44.19:23 of the Code of Virginia, governing trading and offsetting, to meet the required reductions.*
- (d) *Permittees required to develop and implement a Chesapeake Bay TMDL Action Plan shall submit an annual report to the department by June 30<sup>th</sup> of each year describing the progress in meeting the required reductions.*

A TMDL Action Plan special condition has been added to CEDS and should be used to track the required submittal of either a TMDL Action Plan or calculations demonstrating that no Plan is required for each of the three parameters of concern.

**Fact Sheet Language**

The Fact Sheet Basis for Effluent Limitations Table should include "BPJ" for the nutrient monitoring requirements with the following narrative rationale:

*Nutrient Monitoring Requirements*

*Nonsignificant dischargers are subject to aggregate wasteload allocations for Total Nitrogen (TN), Total Phosphorous (TP) and Sediments under the Total Maximum Daily Load (TMDL) for Chesapeake Bay. Monitoring of TN and TP is required in order to verify the aggregate wasteload allocations.*